Sewage Treatment Plant Process Control and Equipment Upkeep

26 April – 7 May 2027
Barcelona (Spain)

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Sewage Treatment Plant Process Control and Equipment Upkeep

Ref: 15992_1001708 **Date:** 26 April – 7 May 2027 **Location:** Barcelona (Spain) **Fees:** 11100 Euro

Sewage Treatment Plant Process Control and Equipment Upkeep is a 2-week course for operators, process staff and maintenance planners at municipal and industrial treatment works. You learn to steer the activated sludge process through dissolved oxygen, return and waste sludge control, remove nutrients, correct bulking and foaming, and plan upkeep of pumps, blowers and dewatering units, then build a Process Control and Upkeep Plan for your plant. Mercury Training Center delivers this sewage treatment plant course.

About This Course

Many plants meet effluent limits only until load, temperature or a failed blower upsets the biology. This course shows you how to read the process early and keep machines ready. You should already work on a treatment plant or supervise one. You practice on laboratory sheets, settleability results, operating logs and equipment histories.

Who It Is For

- Shift staff who adjust aeration, sludge return and chemical dosing day to day.
- Process staff who interpret laboratory results and set operating targets.
- Maintenance staff who look after pumps, blowers, mixers, valves and dewatering machines.
- Supervisors accountable for effluent quality, plant safety and operating costs.
- Staff at industrial sites who run effluent plants alongside production.

This course is not for readers new to wastewater who need an overview of treatment stages, who are better served by a shorter introductory operation course, nor for design engineers sizing new works, who need a course on treatment plant design.

Competencies You Will Build

- Aeration Control: you set and adjust dissolved oxygen targets by basin and season.
- Sludge Inventory Control: you calculate sludge age and set return and wasting rates.
- Nutrient Removal: you tune anoxic and aerobic zones to meet nitrogen and phosphorus limits.
- Upset Diagnosis: you recognize bulking, foaming and toxic shock and choose a response.
- Equipment Upkeep Planning: you schedule preventive tasks for critical machines from failure history.
- Safe Plant Work: you apply confined space, chemical and isolation controls to every task.

What You Will Be Able to Do

By the end of the course you will be able to:

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- Given mixed liquor, settleability and flow data, calculate sludge age and F/M ratio and set a wasting rate.
- Using dissolved oxygen trends, adjust blower output to cut energy use without losing nitrification.
- From microscope observations and SVI results, identify the cause of poor settling and plan corrections.
- Given effluent nitrogen and phosphorus results, change recycle rates or chemical dosing to restore compliance.
- Using pump and blower breakdown records, build a preventive task list with intervals and spares.
- From an operating log after an upset, write a recovery sequence and an incident note.

Course Content

Day 1: Treatment Stages and Plant Data

- Primary, Secondary And Tertiary Stages In Municipal And Industrial Works
- Influent Characterization With BOD, COD, TSS And Ammonia
- Sampling Points, Composite Samples And Laboratory Routines
- Effluent Permit Parameters And Reporting Duties
- Plant Log Sheets And Data Trending For Operators

Day 2: Preliminary and Primary Treatment

- Screen And Grit Removal Performance Checks
- Flow Measurement And Equalization During Storm Loads
- Primary Clarifier Loading And Sludge Blanket Control
- Scum Handling And Odor Control At Inlet Works
- Septic Influent And Industrial Discharge Effects On Downstream Biology

Day 3: Activated Sludge Fundamentals

- Microbial Population And Floc Formation In Aeration Basins
- Mixed Liquor Suspended Solids And Sludge Age Calculation
- Food-To-Microorganism Ratio For Load Changes
- Settleability Tests, SVI And Secondary Clarifier Behavior
- Trickling Filters And MBR Units Compared With Conventional Aeration

Day 4: Aeration and Sludge Inventory Control

- Dissolved Oxygen Setpoints By Zone And Temperature
- Blower Control Strategies For Energy Saving
- Return Activated Sludge Rate Setting From Blanket Depth
- Waste Activated Sludge Rate Setting From Sludge Age
- Diffuser Fouling Checks And Aeration Efficiency Testing

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Day 5: Nutrient Removal

- Nitrification Conditions, Alkalinity And Temperature Effects
- Anoxic Zone Denitrification And Internal Recycle Control
- Biological Phosphorus Removal In Anaerobic Selectors
- Chemical Phosphorus Precipitation With Metal Salts
- Nutrient Profiles Across Basins For Fault Finding

Day 6: Process Upsets and Troubleshooting

- Filamentous Bulking Identification By Microscope
- Foaming Causes And Control In Aeration Basins
- Pin Floc, Rising Sludge And Clarifier Carryover
- Toxic Shock And Industrial Slug Load Response
- Disinfection Performance With Chlorine And UV Systems

Day 7: Sludge Treatment and Dewatering

- Thickening Options For Primary And Waste Sludge
- Anaerobic Digester Monitoring And Gas Recovery
- Polymer Selection And Jar Testing For Dewatering
- Belt Press, Centrifuge And Drying Bed Operation
- Sludge Disposal Routes, Land Application And Reuse Limits

Day 8: Equipment Upkeep

- Pump, Blower, Mixer And Valve Failure Modes
- Preventive Task Lists And Lubrication Routines For Rotating Machines
- Vibration And Temperature Checks For Condition Monitoring
- Corrosion And Scaling In Wet Wells, Pipework And Dosing Lines
- Critical Spares And Work Order Records For Treatment Plants

Day 9: Safety, Energy and Reporting

- Confined Space Entry, Gas Testing And Lockout Procedures
- Chemical Storage, Handling And Spill Response
- Emergency Plans For Power Loss And Equipment Failure
- Energy Benchmarks And Cost Reduction For Aeration And Pumping
- Shift Handover, Incident Records And Reports To Authorities

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Day 10: Process and Upkeep Practice

- Exercise: Sludge Age And Wasting Calculation From A Plant Data Set
- Exercise: Bulking Diagnosis And Recovery Sequence
- Exercise: Preventive Task List For A Blower House
- Automation, SCADA Alarms And Online Sensors For Daily Control
- Process Control and Upkeep Plan Completion And Peer Review

Case Studies and Exercises

The following are suggested activities used during the course:

- Case study: a municipal plant fails its ammonia limit each cold season; you decide the changes to sludge age and aeration.
- Case study: a food processing effluent plant suffers foaming after a production change; you identify the cause and the control steps.
- Exercise: for a residential compound package plant, you set return and wasting rates from a week of data.
- Exercise: for a dewatering building at a regional works, you build a preventive task list and critical spares list.

What You Take Back

You return with a Process Control and Upkeep Plan for your own plant. In your first month back, use it to agree operating targets with your supervisor, start daily trend sheets on your shift and load the preventive tasks for critical machines into your work order system.

- Operating targets for dissolved oxygen, sludge age and return rates.
- An upset response guide for bulking, foaming and shock loads.
- A preventive task list with intervals for critical equipment.
- A daily and weekly monitoring sheet.

Quick Answers FAQ

What should I know before a sewage treatment plant process control course?

You should already work on, or supervise, a treatment plant and know its main stages. Basic arithmetic for rates and concentrations is enough. Bringing recent laboratory and operating data from your plant lets you use it in the exercises.

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How does a sewage treatment plant process control course differ from an introductory plant operation course?

An introductory course explains treatment stages and routine duties. This two-week course goes further into steering the biology with oxygen and sludge control, removing nutrients, fixing upsets and planning upkeep of the machines that keep the process running.

What causes sludge bulking in an activated sludge plant?

Bulking is usually caused by filamentous organisms that thrive on low dissolved oxygen, low food-to-microorganism ratio, septic influent or nutrient shortage. The fix depends on the organism found under the microscope and the condition that favored it.

What do I take back from sewage treatment process control and upkeep training?

You take back a Process Control and Upkeep Plan for your plant: operating targets, an upset response guide, a preventive task list for critical equipment and a monitoring sheet for daily use.

For Your Manager

After this course, the team member will be able to set aeration and sludge targets, keep nutrient removal on track, correct bulking and foaming, and plan preventive upkeep of critical machines. They return with a Process Control and Upkeep Plan for the plant, first used to agree shift operating targets and to schedule equipment tasks.

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